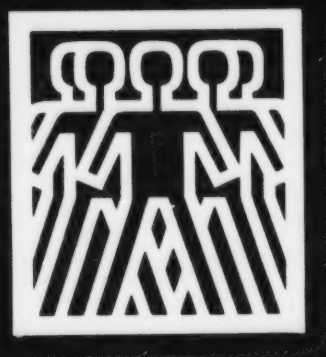

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SANITARY LANDFILL
LEGISLATION, ENVIRONMENTAL PROTECTION, AND QUALITY OF LIFE ISSUES

L-72

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This report is made available as a public service. The Department of Environment neither approves nor disagrees with the conclusions expressed herein, which are the responsibility of the author.

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EXECUTIVE SUMMARY

This paper has been assembled in response to a request from the Branch Heads Committee on Sanitary Landfill. The terms of reference were to document regulations and legislation in Alberta regarding sanitary landfill and determine their adequacy in terms of environmental protection and quality of life.

Information reviewed consisted of:

1. Regulations from Manitoba, Alberta, Saskatchewan, British Columbia, and the Federal Government;
2. Eco/Log Week since 1 January 1976; and
3. Several studies and proposals from eastern Canada and the United States.

Major areas discussed included:

1. Regulations in Alberta and other provinces.
   In Alberta, these regulations come under the jurisdiction of the provincial Board of Health and centre on:
   a. The different available waste disposal systems;
   b. The provision of disposal sites;
   c. Land tenure; and
   d. The design and operation of disposal sites.
2. Environmental protection issues, including site planning concerns which relate to the operation of any noxious or industrial facility in a community; i.e., increase in truck traffic, noise, odour, visual impact effect on property values, etc.
3. Quality of life concerns as they relate to an individual's perception of the impact the facility will have on the community. These are site specific.
4. Public health concerns will be discussed in another paper.
5. Policy issues--rationale for constructing and operating these facilities.

Comparisons, with legislations from other provinces will provide any alterations that might be made to Alberta regulations.

1. INTRODUCTION

This paper discusses the legislative, environmental protection, and quality of life issues as they relate to sanitary landfills in Alberta. It was preserved at the workshop on Sanitary Landfills held at the Alberta Environmental Centre, Vegreville on 17 and 18 February 1981.

The paper was written from the perspective of an outsider. The major goal was to provide an objective perspective on the issues of environmental protection and quality of life as they relate to the legislation, siting, and operation of sanitary landfills.

An initial observation is that present legislation takes into account concerns about environmental protection and quality of life. However, this paper suggests a re-emphasis of priorities.

2. REGULATIONS IN ALBERTA AS THEY RELATE TO ENVIRONMENTAL PROTECTION AND QUALITY OF LIFE

2.1 REGULATIONS

Although accurate records have not been made of the fate of all waste in Alberta, landfilling is likely the most common disposal procedure.

In Alberta, at present, sanitary landfills are permitted and regulated by the Provincial Board of Health under the Public Health Act. The Board refers to other government departments such as Alberta Environment for technical advice and recommendations regarding site suitability and so forth (Environment Council of Alberta 1981).

At present, several jurisdictions are responsible for different wastes as follows (Gardner and Ullman 1980):

1. Department of Agriculture--animal wastes;
2. Energy and Natural Resources--solid wastes;
3. Social Services and Community Health--sanitary landfills;
4. Department of Municipal Affairs;
5. Energy Resources Conservation Board--petroleum production wastes;
6. Environment Canada--all wastes; and
7. Municipalities and Counties--solid waste and advice.

The Environmental Protection Service (EPS) is responsible for administering Alberta Environment's waste management policies. These policies stem from the following acts:

1. Department of Environment Act--designates the Minister as being responsible for co-ordinating policies, program, and activities of the government pertaining to all matters affecting the environment;
2. Beverage Container Act--deals specifically with recycling and is administered by the Waste Management Branch (Pollution Control Division);
3. Litter Act--contains definitions, conditions of offence, and alternative methods for clean-up and is administered by the Waste Management Branch;

4. Hazardous Chemicals Act--administered by the Waste Management Branch and restricts and controls those chemicals not under federal legislation;
5. Clean Air and Clean Water Acts--regulate air and water equality through Standards and Approvals Division;
6. Agricultural Chemicals Act--regulates the handling and disposal of herbicides, insecticides, biocides, and fertilizers and is administered by the Pesticide Chemicals Branch (Pollution Control Division); and
7. Land Surface and Conservation Act--allows and Environmental Impact Assessment to be ordered where an operation or activity will result in surface disturbance and is administered by the Environmental Assessment Division.

Evidently, during the 1970's, a number of branches and divisions have developed different responsibilities and interests in wastes.

2.2 PRACTICE

The functional responsibility for waste management is through EPS. The EPS has the expertise and the administrative framework to handle such a program. Nine programs are administered by Alberta Environment as the co-ordinator of waste management; for example, the Regional Landfill Program, the Derelict Vehicle Removal and Recycling Program, and so forth. One report (Gardner and Ullman 1980) suggests these program are interpreted as policies by the divisions who administer them.

No well-defined policy has been outlined; some regulations are unspecific and jurisdictions are split not only among several branches and divisons within one department but also between departments. These factors--together with vaguely written regulations which do not translate well into practice, the fact that certain pieces of information regarding the quantity, type, source, and destination of

the waste are missing due to a voluntary only reporting system--lead to an almost unenforceable waste management practice.

2.3 RELATIONSHIP BETWEEN LEGISLATION, PRACTICE, AND ENVIRONMENTAL PROTECTION

The effect of sanitary landfills on the environment, and particularly on groundwater resources, has been the focus of attention in Alberta since 1972. Field studies conducted since that time have been designed primarily to determine:

1. Whether groundwater contamination occurs under the climatic conditions of prairie Canada;
2. The rate and mechanism by which contaminants may migrate; and
3. The fate of contaminants upon passage through subsurface geologic media.

Such studies have been conducted in the absence of a defined program with specific research objectives (Moell 1980). These types of research studies can produce information to assist, for example, in site selection. Site selection criteria generally recognize both leachate and gas production from landfills and attempt to specify soil properties which will limit the migration of both liquid and gaseous contaminants.

Alberta Environment has a broad area of responsibility. Some elements of the department's mandate bear directly on the environmental implications of waste management. The five major program areas--pollution prevention, land conservation, water resource management, environmental research, and the support services--have an emphasis on prevention rather than treatment. Specific issues related to environmental protection and quality of life will be discussed next.

3. ISSUES RELATED TO ENVIRONMENTAL PROTECTION AND QUALITY OF LIFE

Major concerns of the "public" have been documented (Institute of Environmental Research Inc. 1979) as follows:

1. Environmental and health concerns are those that relate to the hazards to environment or to human health associated with storing solid wastes;
2. Site planning concerns are those related to the operation of any noxious or industrial facility in a community, such as an increase in truck traffic, noise, odour, visual impact, and the effect on property values;
3. Policy concerns are those related to the philosophy underlying construction and operation of solid waste storage sites; and
4. Quality of life concerns are those that relate to the individual's subjective perception of the impact the site will have on living in the community.

These will be discussed under the two headings of environmental protection and quality of life.

3.1 ENVIRONMENTAL PROTECTION

In trying to plan for and develop new waste disposal facilities, operators are faced with criteria not explicit enough to avoid personal interpretations and arbitrary applications of general design criteria to specific design concepts and plans.

Difficulties can arise when regulatory agencies try to dictate very detailed standards and then proceed to hold the operator responsible for the environmental performance of the site. Conversely, problems can also stem from a lack of specific environmental quality standards for which the operator will be held accountable during the life of the site and for some time after closure (Eco/Log Week 1980c).

Legislation ensuring adverse environmental impacts will be scrutinized prior to the commitment to project plans and which is binding is virtually non-existent. Ad hoc waste-disposals are done

and are done without comprehensive and legally binding plans. These ad hoc licensings of waste disposal sites are hardly better than unrestricted developments (Estrin 1974).

In Alberta, siting sanitary landfills attempts to take into consideration criteria related to environmental protection, such as:

1. Geologic conditions;
2. Hydrogeologic conditions;
3. Areas where subsurface flow is contained;
4. Topsoil preservation;
5. Distances to housing/cemetaries, etc.;
6. An access road; and
7. Level of water table.

Also, regulations regarding the composition of the waste have been articulated to ensure chemical content is kept to a minimum. Since no documentation system exists, such as the waybill used in Ontario to determine nature, quantity, carrier, and destination of each shipment, this cannot be ensured.

Environmental damage does exist (Reid Crowther and Partners Ltd. 1980). This includes groundwater contamination through leachate generation; surface water contamination due to runoff; air pollution from burning; poisoning from direct contact.

Monitoring disposal sites serves as a check on potential leachate contamination, a control strategy, to check the effectiveness of the site design and so forth. Cost can be prohibitive for groundwater monitoring.

3.2 QUALITY OF LIFE

The Planning Division of Alberta Environment has stated (Alberta Environment 1976) that quality of life formerly was measured by per capita income. Now, what the Division terms "social conditions" constitute more acceptable measures of quality of life. The social conditions include:

1. Health;
2. Housing;
3. Education;

4. Employment
5. Culture, recreation, and leisure time;
6. Legal justice and public safety;
7. Transportation and communications; and
8. Environmental quality.

Specifically, under the heading of environmental quality, the public shows concern about air quality, water quality, solid wastes, noise radiation, toxic substances, natural hazards, and aesthetics.

The federal government recognizes the reality that environmental quality program cannot be maintained by one level of government alone and seeks co-operation (Dwivedi 1974). The public concern about pollution brought the Federal and Provincial governments together. The possibility exists that, once public demand is met by creating administrative mechanisms, governments can take a complacent view of the situation. Public concern about a particular problem cannot be expected to remain at the same level. Witness the present heightened level of concern regarding hazardous wastes in Alberta. Rightly or wrongly, distinction between types of wastes will not necessarily be made in the minds of the public.

Two attitudes prevail regarding waste management (Gardner and Ullman 1980):

1. Alberta Environment is totally responsible for waste management and all environmental problems in Alberta; and
2. Alberta Environment has never clarified its role with regard to waste management in Alberta.

Because of these perceptions, the general public does not believe the Department is meeting its objectives.

The solid waste management assistance program assists communities in establishing sanitary landfills or upgrading existing dumps. This program involves interaction with groups representing communities interested in forming a regional landfill authority. Funding is available for this and all the engineering work necessary.

There exists, however, the NIMBY ("not in my backyard") syndrome since the public is aware of the potentially detrimental environmental effects on their quality of life. While environmental

considerations do pose a challege, social problems are the biggest. Many technical concerns can be "engineered out", but some social concerns cannot (Krawetz 1980).

Several sources (Gardner and Ullman 1980; Institute for Environmental Research Inc. 1979; Krawetz 1980; Noble 1976) suggest roles for public input into legislation and regulation formulation, the total waste management process, and site selection specifically.

You are referred to the public involvement process outlined in Krawetz's report. Some major elements are highlighted below:

1. Timing--anyone contemplating establishing a new landfill who wishes to reduce the risk of failure should involve the public from the beinning, regardless of whether or not it is a requirement;
2. Definition of Roles--government, operator, politician public;
3. The Process--must be defined;
4. Public Education--needs must be defined; and
5. Research Needs--must be defined.

Community verification and validation of the waste management process is considered critical (from technology assessment and evaluation to site selection criteria and the selection of the site). This will ensure that there is a real understanding of the need for a sanitary landfill. The most perfectly suitable site, technically, should never be established if the general public is opposed to it. Proof is needed that:

1. It can solve the waste problems of the community;
2. It can be engineered and operated to avoid deterioration of the environment; and
3. The final use for the site will be a real value to community.

Having outlined environmental and quality of life issues in Alberta, some of which are not dealt with in the legislation, now is the time to review legislation and regulations from other jurisdictions.

4. LEGISLATION FROM OTHER JURISDICTIONS

There appears to be no uniform pattern of provincial regulation which would apply equally to all provinces in Canada. As a general rule, provinces have shied away from setting precise and legally enforceable standards, preferring instead to establish broader objectives as a baseline for evaluating municipal performance and then for negotiating compliance with these objectives. As of 1972, Alberta, Ontario, and Nova Scotia were the only provinces to have set such objectives (Woodson 1974). However, the provinces have shown a general reluctance towards the use of judicial mechanisms in pollution control, preferring instead to use carrots in the form of financial assistance.

British Columbia held a public inquiry (1973) and accepted the following basic principles:

1. The capacity of receiving areas to assimulate wastes is a renewable resource to be conserved and the recycling of wastes and the preservation of land, air, and water is necessary;
2. The onus is on the applicant for adequate landfill design; and
3. There is a need for province-wide discharge objectives in addition to receiving environment objectives.

Manitoba's location criteria bear a remarkable resemblance to those operating in Alberta, although the regulations appear as part of the Clean Environment Act (1976).

In Saskatchewan, permits of operation (1975) are given only when the Minister of Environment has stated that water control measures are adequate and adequate site preparation has been made (whatever that means). The monitoring of landfills is the responsibility of each municipality. As a point to note, of the 650 disposal sites in the province, three are actually monitored (Office of Solid Waste 1974).

Federal facilities should use provincially approved disposal services, provided such disposal facilities and services conform to recommended practices provided for in the Code of Good Practice on Dump Closing or Conversion to Landfill at Federal Establishments and the Air Pollution Guidelines Applicable to Incinerators at Federal Establishments.

Information about industrial waste in Canada is not abundant. A new waybill system instituted in Ontario, in January 1979, identifies the constituents of the wate, where the waste is produced, how much waste there is, and the method of disposal.

Calgary is considered to be the most progressive municipality in Alberta in controlling the disposal of industrial waste into landfills through the use of permits (Environment Council of Alberta 1980). Permits are not required in Edmonton; both systems operate on the honour system. The City of Edmonton believes provincial leadership is necessary.

The emerging view in the United States is that costs to the public for environmental neglect may well exceed the costs for regulated preventive measures which ensure proper waste management (known as the "you can pay me now or pay me later" syndrome).

5. FUTURE FOR WASTE LEGISLATION

The eclipse of a federal solid waste law in the United States by other pollution media has, to a great extent, been the result of four historic assumptions about solid waste (Goldfarb 1979):

1. Solid waste is relatively innocuous;
2. Solid waste management is an inherently local and state problem;
3. Solid waste problems are susceptible to technological solutions; and
4. Remedial technology can and should be developed and applied primarily by the private sector.

These assumptions may once have been correct, but, since much of the waste now contains by-products from industrial and chemical processes, they can no longer be said to hold true.

Increasing sophistication of not only the law-makers but also the public has transformed attitudes towards regulations in general and waste management regulations in particular. Risk regulation pose a peculiar problem for government (Bazelon 1979). As our understanding of the world grows, we are constantly learning that old activities once thought safe, in fact, pose quite a risk. Questions to be answered are:

How much risk is acceptable?

How much risk does a given activity pose?

To the first question, it is a choice of values; to the second, sometime not even the experts have the answers. Under these circumstances, the questions of who decides acceptability of risk (to the environment, quality of life, etc.) and how that decision is made become critical. Decisions may be in the hands of politicians or legislators with little training in specific scientific fields (Bazelon 1979).

There has been an incerase in public involvement in decisions which, in the past, were left entirely to the scientific community. Sometimes the public's emotional reaction to risk is not always in proportion to the seriousness of the threatened harm. However, the public's fears are real. Scientist, regulator, lawyer, and layman need to reconcile roles and conflicting values, and make the attempt to understand these roles in addressing the public regulation of risk.

This philosophical discussion provides a background to indicate the necessity to develop policies that reflect the governments intentions. Specifically, comprehensive waste management legislation should be provided in the context of the values and type of society to which the government is committed and the risks that government is prepared to take. There is a need to concentrate on an appropriate environmental ethic that is congruent with these ideals (Gardner and Ullman 1980).

5.1 CONSIDERATIONS FOR THE FUTURE

Without a clear definitive goal that summarizes the intent of the government, it also becomes extremely difficult to focus the resources of each department and each group within a department toward a specific end. Whaterever the goal might be, some suggested considerations are (Gardner and Ullman 1980):

1. The role of industry and individual consumers--which should be to understand and participate in waste management programs in Alberta;
2. To work towards waste reduction at source;
3. To ensure overall strategies developed for waste management interface with those developed for hazardous waste management and that, in all waste management decisions, public health, quality of life factors, and environmental safety are paramount considerations;
4. The aim of legislation--which should be to mesh the social goals of the province in both the broad context of public values and the narrow context of waste management;
5. The government--which should develop a legislative framework for waste reduction, recovery, and disposal and not just regulate sanitary landfills; and
6. The strategy to be used after the determination of the role the development of a legislative framework--policy development; and program and planning examples of the types of programs (siting biophysical concerns

monitoring program, public involvement programs). Planning analysis should provide data on the composition of the audience, the concerns, the appropriate information content, and the range of techniques available.

5.2 WHERE CAN ALBERTA GO?

Existing legislation in Alberta does not provide an adequate framework for proper waste management. Legislation should prescribe an integrated waste management system which includes recovery, recycling, research and development, and on- and off-site treatment and storage. Draft legislation for waste management in Alberta had, as its thrust, the need to specifically address the comprehensive management of wastes from production through recovery to innovative disposal. These new approaches have almost totally been deleted from the proposed legislation in its present form.

Information needs are many and fall into three categories. These categories are not numbered in order of importance.

5.2.1 Environmental factors

The components of this category can be divided into:

1. Waste material--information is needed on the source, type, and quantity of the material. A manifest classification system, performance, and process standards will help to keep a check on this. Information on distance characteristics is also, needed, with special reference to collection and transport systems, transfer stations, and type of processing needed.
2. The site--(a) where sites are already existing but need upgrading, public acceptance is usually a far less serious problem; and (b) new sites require information related to geology, natural setting, economics, social and political concerns, physical characteristics, location, land use needs, accessibility, climate, hydrogeology, the historic high

groundwater table, the availability of site improvement material, and the long-term use needs.

3. The environment--in the United States, there is a perceived need for an Environmental Impact Assessment for each waste management site using EPA or USGS guidelines. This assessment would consider physical, chemical, ecological, aesthetic, health, and safety issues. In Alberta, under the Land Surface Conservation and Reclamation Act, the mechanism exists to do the same thing. This is however, at the discretion of the Minister of Environment and not a necessity. However, if an EIA were called for, it would, in its turn, provide a mechanism, although not a totally satisfactory one, for public input.

5.2.2 Economic Factors

Consideration should be given to costs related to:

1. Distances named;
2. Method of hauling;
3. The cost of the land;
4. The cost of site preparation;
5. Manpower for operating the site;
6. The installation of environmental control systems;
7. Equipment;
8. Long-term monitoring equipment; and
9. Post-landfilling maintenance.

5.3.3 Social/Political Factors

Mismanagement of sanitary landfills in the past has alienated the public as evidenced by strong objections at hearings for new disposal sites in the United States (Vardy 1972). When considering the social/political factors, the following issues should be accounted for:

1. Existing legislation;
2. Existing plans;

3. Political climate;
4. What programs are needed to achieve public acceptance (refer to Krawetz 1980);
5. Land-use zoning control;
6. Community interests; and
7. Individual interests.

The extensive "need-to-know" list is daunting. Once negotiation related to the inevitable trade-offs between issues and between the players is considered, a program for waste management suggests a long-time frame. The ideal process has a realistic time frame of several years.

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